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THE CALCIFEROUS OF THE MOHAWK VALLEY

BY

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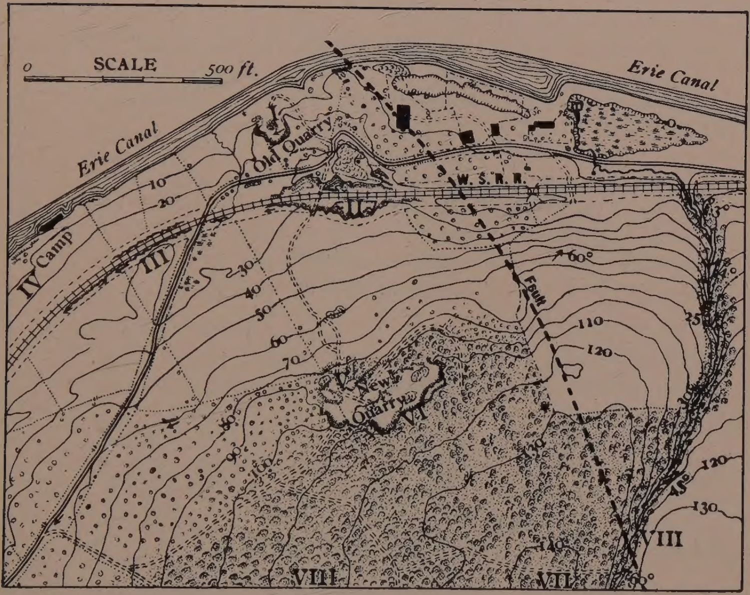
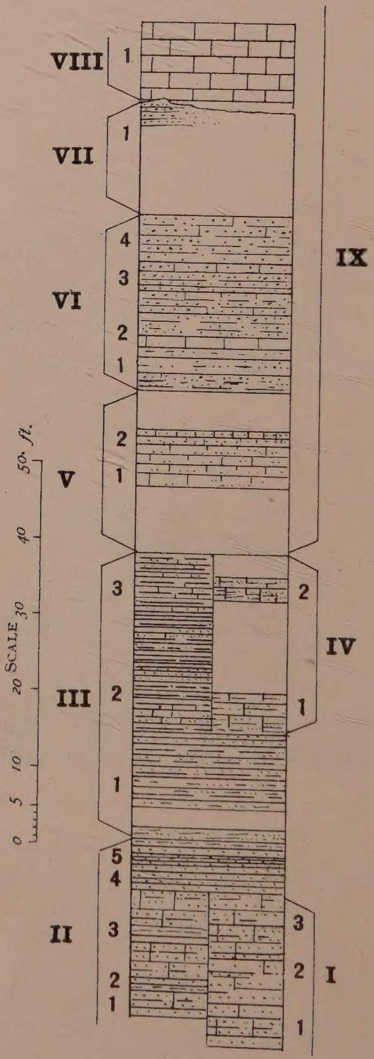
SUMMARY OF CONTENTS

EXPLANATION OF SECTION.......... 5-6
INTRODUCTION.......... 7
HISTORICAL SKETCH.......... 8-9
CONCLUSION.......... 10
DESCRIPTION OF SPECIES.......... 11
  Gastropoda.......... 11-15
  Trilobita.......... 15-17
  Brachiopoda.......... 17-19
  Cephalopoda.......... 19-20
  Pelecypoda (?).......... 20-22
  Echinodermata.......... 22
EXPLANATION OF PLATES.......... 24-26



Map of the Fossiliferous Outcrops East of Ft. Hunter New York



Section 1 Mile East of Ft. Hunter N. Y.

EXPLANATION OF SECTION

(See Plate 14 a.)

About one mile east of Ft. Hunter. Lat. 42° 57′, Long. 74° 16′; Florida township, Montgomery Co., N. Y.

I. Old Wemple quarry by canal, beginning at level of surface of canal.

   1. Shaly, calcareous sandstone layers, weathering irregularly, changing from gray to yellowish in color.
   2. As in 1, but containing obscure traces of *Ophileta*.
   3. Within four feet of top ledges of quarry, *Ophileta* and other fossils observed. Surfaces weather very irregularly. Gray calcareous sandstone, traceable to railroad cut.

II Quarry by railroad track, beginning with lowest bed exposed; concretionary disturbances frequent and of considerable magnitude, especially towards eastern end of cut. Perpendicular joints few. Other running N.68° W. dip northeasterly at an angle of about 45°.

   1. Blackish limestone, with clay laminæ, at lines of parting, sandy in spots. More sandy above.
   2. As in 1, but with yellow ferruginous band, 4 inches thick at base and more or less yellowish throughout.
   3. Ten feet of heavy-bedded grayish and sometimes yellowish mottled calcareous sandstone ledges. *Orthoceras* zone 2.7 feet above yellow band mentioned under 2. A second yellow band is 7 feet from top ledge of quarry.
   4. As under 3, but becoming thin bedded and containing Cystidean remains in upper layers.
   5. A sandstone ledge, with numerous specimens of *Syntrophia* at base.

III. 1, 2, 3. Thin-bedded layers of shaly sandstone, sometimes calcareous, exposed along railroad west of quarry; seen in Pl. 13 for one-fourth mile.

IV. Near canal, west of the curve in the railroad shown in Pl. 13, by old, decaying canal boat.

1. Calcareous, shaly and sandy, thin-bedded layers at edge of canal, with *Syntrophia*.
2. Slight outcrops in pasture south of 1, towards the railroad, with *Asaphus convexus?*, *Harrisia*, *et al.*

V. Lower part of large quarry south of railroad one-fourth mile. See map, Pl. 14, below the floor rock of quarry.

1. Firm, mottled, grayish calcareous sandstone layers.
2. Layer seen at the base (floor) and northern edge of quarry; about one foot thick, replete with Gastropoda, with *Asaphus canalis*, *et al.*

VI. Southern margin, escapement, of quarry.*

1. Gray sandy layers, 6 feet in thickness.
2. A layer with a few fossils. *P. hunterensis*, *E. multiseptarius*, *et al.*
3. Typical Calciferous sandstone layers containing an abundance of *Ribeiria*.
4. Same typical Calciferous sandstone as in 3.

VII. The highest ground shown in the map (Pl. 14) is underlaid by Calciferous sandstone. Along the southern limit of the map there is, generally, a slight S. W. dip, so that just to the west of the stone fence the Calciferous passes under the quarries in the Trenton limestone. In the S. E. portion of the map the dip changes to E. N. E., caused by the fault passing from there N. N.W. to and beyond the E. end of the railroad quarry shown in Pl. 13. East of fault line the bedrock is mostly Utica shale, though a little Trenton limestone is exposed in the very southeast corner of the map.

VIII. Quarries in Trenton limestone best seen just south of the area shown in map.

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*Beds VI 2 and 3 are seen in the nearly vertical walls of the quarry. *E. multiseptarius*, *P. floridensis* were collected from a projecting ledge of VI 2. This ledge is probably a continuation of the stratum exposed about 1000 feet N. E. of the quarry containing *E. multiseptarius*.

The most fossiliferous bed of the section is the 1 ft. 10 in. of VI 3, well exposed on the western half of this escapement and also on the W side of the quarry. The fossils obtained from this stratum are, in order of abundance, *Ribeiria*, *Ophileta*, *Asaphus*. These fossils are often colored green, the color being due to the presence of copper. The limestone when weathered crumbles readily, making collecting especially easy.—*From notes of J. Pacheco, C. U. '02.*

INTRODUCTION

The Cornell Summer School of Geology, under the direction of Prof. G. D. Harris, had, as one of its objects, the correlation, if possible, of the Calciferous of the Mohawk Valley with the divisions of the Lake Champlain Calciferous, as determined by Professors E. Brainard and H. M. Seely*. For this purpose the type localities of Shoreham, Vt., Ft. Ticonderoga, N. Y., and others along Lake Champlain were visited. After an examination of the type sections the party studied the Calciferous in the Mohawk Valley. Several outcrops of this stage on the route were examined. It was while doing this work that the extremely fossiliferous locality near Ft. Hunter was discovered, as well as a fossiliferous stratum near the top of the hill south of Little Falls, N. Y. Although the party did not succeed in correlating the divisions of the Lake Champlain Calciferous with those of the Mohawk Valley, the discovery of these two outcrops in a region which has been considered so poor in fossils justified the expenditure of time and effort.

Through the kindness of Prof. G. D. Harris, all of the material collected at the Ft. Hunter locality was turned over to the writer for study, and every facility given for carrying on the work.

Thanks are due Prof. C. E. Beecher, to whom the identifications of the trilobites were referred; to the students of the summer school, and especially to Prof. Harris, who figured the fossils and with A. C. Veatch prepared the topographic sheet and section, and through whose kindness this paper was made possible.

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*Am. Mus. Nat. His. Bull., vol. 3, pp. 1–23, 1890–91.

HISTORICAL SKETCH

The rocks of the Calciferous stage were first described by Amos Eaton* (1824) as "an aggregate of quartsose sand and fine grains of carbonate of lime." The locality mentioned by Eaton as the most perfect , as well as the most accessible to those who travel the canal, is Flint Hill, in Florida township (the township in which our section is situated).

Conrad† (1837) states: The first rock which appears above the Gneiss in our [3rd] district is called the "calciferous sandrock * * * the general inclination of which is 4 or 5 degrees to SW., which causes the rock to be lost to observation to the south of the Mohawk. Dislocations or faults and curves in the stratification are common."

In a summary of the geologic stages of the the third district, Vanuxem‡ (1838) makes the following statement: "Fossils, other than Fucoids of the largest species, are exceedingly rare [in the Calciferous]. I found two or three specimens; they were casts of small univalves * * * likewise two fragments belonging to crustaceæ; all these specimens were found in an upper layer of the rock."

His final report|| (1842) of the Calciferous contains a very detailed description of the lithological characters of the rock. The stage is divided into "three distinct masses as to character and position. The first is siliceous and compact, and may be a continuation of the Potsdam Sandstone, either in part or almost wholly. The second is a variable mixture of fine yellow siliceous sand and carbonate of lime, which when fractured presents a fine sparkling grain. This is the mass whence the name *Calciferous sand rock* was derived. The third is a mixture of the calcareous material, which is usually yellowish, very sparkling when fresh broken, and of compact limestone, which resembles the birdseye in mineral character, containing also some argillaceous or slaty matter. The whole mass has been designated, in the annual re-

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*A Geological and Agricultural Survey of the district adjoining the Erie canal, 1824.

†1st Ann. Rept. Geol. Sur. of the 3rd Dist. N. Y., 1837, p. 162.

‡2nd " " " " " " " " " " 1838, p. 283.

||Geol. of 3rd Dist. N. Y., 1842, Lardner Vanuxem, p. 30.

ports, by the name Fucoidal layers.'' It is to this division of Vanuxem that C. S. Prosser[*] refers the Calciferous of our section. In writing of this layer Vanuxem further says: ''Besides fucoids it contains other fossils, many of which are peculiar to the rock; they appear to be more numerous where the birdseye mixture exists.'' The wood cut which follows ''exhibits four of the most characteristic fossils of the group,'' viz: 1, *Ophileta levata;* 2, *O. complanata;* 3, a crinoid plate; 4, *Orthoceras primigenium.*

James Hall[†] was of the opinion that ''from the nature of the rock, and from the condition of many of its fossils, we cannot doubt but many more forms, both of plants and animals, were imbedded in it than we find at the present time.'' In the same volume twelve species are figured, of which four are from loose boulders or doubtful localities.

In 1879[‡] C. D. Walcott described six species, without figures, from Saratoga Co.

Between 1881–91 J. M. Whitfield[||] figured and described a large number of fossils, collected by Brainard and Seely, from the Calciferous of Lake Champlain.

Prof. W. B. Dwight[¶] of Vassar in 1884 described eight new species from the Calciferous of Wappinger Valley at Rockdale, N. Y.

In his report on the ''Lower Silurian Sections,''[§] C. S. Prosser makes no mention of fossils, although he describes the quarry and railroad cut from which our fauna was obtained. Up to the present time the number of species from the Calciferous of the Mohawk Valley has not been materially increased since the publication of Vol. 1, Pal. N. Y.

In this paper twenty-two species are described from this stage, of which one genus, 15 species and one variety are figured and described for the first time.

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[*] Rept. of the State Geol. N. Y., vol. 1, 1895. Sections and thickness of the Lower Silurian Formations on West Canada Creek and in the Mohawk Valley, p. 646.

[†] Pal. N. Y., vol. 1, p. 5, 1847.

[‡] N. Y. State Mus. Nat. His. Rept. 32.

[||] Am. Mus. Nat, His. Bull., vols. 1, 2, 3.

[§] Prosser, Rept. Geol. N. Y., vol. I, 1895.

[¶] Am. Jour. Sci., 3rd series, vol. 27, pp. 249, 259.

CONCLUSION

The Ft. Hunter fauna is, as far as our present knowledge goes, an isolated one, bearing a resemblance to both the Point Levis fauna* and that of the Lake Champlain Calciferous†. As one would expect from the geographical position of these localities, it is more closely related to that of the Lake Champlain region. It is remarkable that the geographical distribution should show such wide differences in the faunas of these localities and that of Rockdale, N. Y.‡. The stratigraphic position and the contained fossils leave little or no doubt as to the correctness of the correlation.

The discovery of this fossiliferous outcrop and that at Little Falls makes it probable that further search will bring to light other interesting localities.

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*Pal. Fos., vol. 1, 1861–1865.

†Am. M. N. H. Bull., vol. 1, 2, 3, 1881–91.

‡The Point Levis fossils (from Point Levis, opposite the city of Quebec) were described by Billings in the Can. Nat. and Geol., vols. 4, 5 and 6, and in Pal. Fos., vol. 1, 1861–5; the Calciferous from Rockdale, Duchess Co., N. Y., by Dwight in the Am. Jour. Sci., 3rd ser., vol. 27.

NOTE.—Clarke and Shuchert suggest the name Beekmantown for this stage. The reason for this change is "to remedy the present incongruity in the nomenclature of the stratigraphic units. As the propriety and necessity of local terms for the designation of such units is generally acknowledged, those formations which have hitherto borne names of other significance are now superseded by appropriate geographic names. This formation took its original name from sections in the Mohawk Valley, where the rocks are without fossils. At Beekmantown the normal fauna is finely developed and the rock section essentially complete.": Am. Geol., vol. 25, No. 2, p. 116.

A DESCRIPTION OF THE FOSSILS FROM NEAR FORT HUNTER, NEW YORK*

ECCULIOMPHALUS Portlock

Ecculiomphalus multiseptarius, n. s., Pl. 15, figs. 1, 2, 3, 4

Shell discoid, loosely coiled, volutions two or more, slender and gradually expanding until, in a specimen 20 mm. in diameter, the outer coil is 6 mm. in diameter; the transverse section of the outer coil is subovate with a tendency to carination on the outer edge. The internal structure, seen in weathered specimens, is at first puzzling. The well developed partitions present, in the natural sections, the appearance of a cephalopod. This is well illustrated by Plate 15, figure 2; the irregularity and great curvature of the partitions distinguish it from that class. A number of small specimens averaging 5 mm. in diameter are probably young forms of this species.

The specimens at hand differ from *E. priscus*, Whitfield, in the more gradual increase in the size of the coils, in the absence of liration, and in the presence of partitions. These last two characteristics may, however, be due to the state of preservation. This shell differs from all others to such an extent that it is necessary to refer it to a new species.

Diameter of a medium specimen, 20 mm.; of a young shell, 5 mm.

Locality.—Bed V 2, near Ft. Hunter.

*All the fossils herein described and figured are in the Paleontological Museum of Cornell University.

OPHILETA Vanuxem

Ophileta discus, n. s., Pl. 15, figs. 5, 6

Shell discoidal, concave on the lower side; spire slightly elevated; whorls four or more, with an elevated, sharp margin on the periphery; the upper side of the whorl flat, the lower rounded and somewhat angulate (see figure of lateral view, Pl. 15, fig. 5). Umbilicus wide, shallow, exposing all of the whorls.

Size, 10 mm. in diameter. This species resembles *Ophileta ottawensis* Billings, but is much smaller, the spire is slightly elevated, and the lower side of the whorl more angulate.

Locality.—Extremely abundant in bed No. V 2, of the Ft. Hunter section.

Ophileta complanata Vanuxem, Pal. N. Y., vol. 1, p. 11, Pl. 3.

A number of specimens which are undoubtedly the same as those referred to this species by Vanuxem and Hall were found in the weathered surfaces of the rock. In every specimen the surface markings were obliterated.

PLEUROTOMARIA Defrance

Pleurotomaria hunterensis, n. s., Pl. 17, figs. 1, 2, 7, 8

Shell conical; spire elevated; umbilicus more than one-half as wide as the whole diameter of the shell; volutions in one specimen more than six, the upper side nearly flat with a faint groove near the edge, the under side slightly angulate; aperture irregularly rhomboidal. The size varies greatly, the largest specimen included in this species being 40 mm. in diameter, the smallest 10 mm., the average is about 20 mm. It is possible that the large specimen, Pl. 17, figs. 1, 2, may not be of the same species as the smaller and more abundant forms, figs. 7, 8, but, until more specimens are collected, it seems best to include them in one species.

This species resembles *P. etna* Billings*, but differs from it in the greater obtuseness of the apical angle, which is 65°–95° in *P. etna* and 108°–120° in our species; in the umbilicus, which is more than one-half the width of the shell in *P. hunterensis*, and one-third the width in *P. etna*.

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*Geol. of Can., Pal. Fos., p. 226, fig. 210.

Locality.—Not common in the section. The large specimen (figs. 1, 2) was found in VI 2, the smaller ones in V 2.

Pleurotomaria floridensis, n. s., Pl. 15, fig. 12

Shell small, conical, apical angle 44°; volutions five, trapezoidal in section; surface of volution slightly rounded; outer lip parallel to the surface of the upper whorls. Umbilicus minute. Total height of shell 4 mm. diameter at base 3mm.

This species differs from *P. beekmanensis*, Whitfield*, in its smaller size, smaller umbilicus, more acute apical angle, and in the surface of the volutions, which are sloping in *P. beekmanensis* and rounded in this species.

Locality.—Found near the top of V 2. A rare fossil at Ft. Hunter, Florida township, N. Y.

HOLOPEA Hall

Holopea turgida, Hall, Pl. 17, fig. 14

Pal. N. Y., vol. 1, p. 12, pl. 3.
Bull. A. M, N. H., vol. 2, p. 50, pl. 9, figs. 3-7.

A single imperfect specimen preserving two whorls answers the description given by Hall: "Depressed—conical; whorls about four, subangular, rapidly increasing from apex; last whorl very large, ventricose, expanded; height and greatest breadth about equal."

Size. 14 mm. in diameter.

Localities.—Reported by Hall from Saratoga Co., N. Y., by Prof. H. M. Seely from Beekmantown, N. Y. A single specimen was found at Ft. Hunter.

RAPHISTOMA Hall

Raphistoma obtusa, n. s., Pl. 15, figs. 7, 8, 9

Shell of medium size, much compressed, convex above; volutions three, the upper surface more compressed than the lower;

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*A. M. N. H. Bull., vol. 2, pl. 8, p. 53.

outer edge very acute, the inner rounded, the upper surface somewhat angulate next to the suture. The margins of the umbilicus are angular; umbilicus about one-third the width of the shell. Apical angle 130°.

This species resembles *R. prævium*, Whitfield, but differs in its smaller size and more obtuse apical angle.

Many of the specimens of this species are much water worn and are found associated with flat, water-worn pebbles.

Locality.—Very common in V 2 at Ft. Hunter, N. Y.

MURCHISONIA D'Archiac and Verneuil

Murchisonia mohawkensis, n. s., Pl. 15, fig. 13

Shell elongate, turbinate, spire somewhat rapidly ascending; volutions obtusely angular along the middle. None of the specimens show the complete shell or the surface markings. The specific characters are such that it cannot be included in any described species. Diameter of shell at the lowest whorl 6 mm.

Locality.—A very rare fossil. Found on the weathered surface of a slab found near the top of No. V. 2, associated with *Ribeiria* (*?*) *nuculitiformis*, *Pleurotomaria floridensis* and *Ecculiomphalus multiseptarius*.

BELLEROPHON Montfort

Bellerophon calcifer, n. s., Pl. 15, figs. 15, 16, 17, 18

Shell discoid. Six whorls are exposed in one specimen, but the number is usually less. Dorsum angulate. Vertical diameter of the specimen figured 8 mm. Umbilicus large, apparently exposing all of the whorls; width 3½ mm.

B. macer, Billings, resembles this species, but is larger, has a smaller number of whorls and a narrower umbilicus, otherwise the resemblance is strong. This species is extremely variable, approaching *B. subovata* in its ventricose forms, with a narrow umbilicus.

Locality.—No. V 2 of the Ft. Hunter section.

Bellerophon subovatus, n. s. Pl. 15, figs. 19, 20, 21

Sub-lenticular, dorsum varying from carinate to rounded according to the age of the shell; greatest width close to the umbilicus; vertical diameter of the largest specimen 9 mm., of the smallest 4 mm. Umbilicus small, sharply rounded on the edge; transverse section of the shell subovate.

This species bears some resemblance to *B. allegoricus* White, but is clearly a distinct species. Very variable. (See under *B. calcifer*, n. s.)

Locality.—Found in No. V 2 of the Ft. Hunter section.

STRAPAROLLUS Montfort

Straparollus parva, n. s. Pl. 15, figs. 10, 11

Shell small; whorls two and one-half, the upper being very small in proportion to the lower. Height 4 mm. A single specimen was found. This species resembles *S. hippolyte* Billings, from the Guelph stage, but is smaller with the lower whorl much larger in proportion to the size of the shell.

Locality.—Found in No. V 2 in the Ft. Hunter section.

Trilobita

HARRISIA--New Genus

Genal angles produced into spines, free cheeks united in front. Facial suture extending forward from the posterior margin of the cephalon along the eye lobes and uniting in front. Eyes oblong, minute.

Harrisia parabola, n. s. Pl. 16, figs. 1, 2, 3

Cephalon small, narrow, parabolic, sloping sharply at the side. Length, width and depth as 3½:7:4. Genal angles produced into spines. The margin turns up in front and presents the appearance of a truncation in front of the glabella.

Facial sutures extend forward from the posterior part of the cephalon within the genal angles, passing inward to the margin of the eye, than forward, almost to the margin of the cephalon, where they turn sharply and unite in front of the glabella.

Glabella small, gradually increasing in size from front to back, very convex, with two pairs of rather obscure lateral furrows. Cheeks depressed, sloping abruptly to the margin. Genal angles produced into sharp spines which are more than two-thirds as long as the glabella.

Eyes oblong, situated very far anteriorally, opposite the anterior one-sixth of the glabella, less than ½ mm. in length.

Thorax and pygidium unknown.

Locality.—No. IV 2 of the Ft. Hunter section.

ASAPHUS Dalman

Asaphus canalis (?) Conrad Pl. 16 figs. 7, 8

A. M. N. H., Bull., vol. 1, p. 336, pl. 34; vol. 2, p. 64, pls. 11. 12.

Several pygidia and free cheeks and one glabella of a species closely resembling *A. canalis* have been referred to that species.

The description is as follows: Cheek large, triangular in outline, projecting backward at the genal angle into a long, thick spine. The spine is rounded, but the thickening becomes more angular as the front of the cheek is approached. Length of largest cheek from the anterior to the end of the spine about 50 mm.; from the suture line below the eye to the margin 18 mm. Eyes prominent; the longest diameter 5mm.

Pygidium large, semi-circular, with a wide doublure; obscurely trilobed or almost perfectly convex, anterior margin nearly straight, axial lobe narrow, marked in one specimen by eight obscure annulations; in some specimens only four or five can be distinguished. In the pygidium of one large individual the axis is depressed. Size varies greatly, from 10 mm. in width and 7 mm. in length for the smallest and 50 mm. in width and from 38 to 40 mm. in length for the largest.

Locality.—No. V 2 of the Ft. Hunter section; not uncommon.

Asaphus convexus, ? Pl. 16 fig. 9

Pygidium semi-circular, convex, sloping evenly to the lateral but sharply to the posterior margin. Doublure strong but not so marked as in *A. canalis* or *gigas*. Axis broad, not strongly arched, tapering to a very obtuse termination; only three indestinct annulations can be distinguished. Varies in size from 7 mm. by 5 mm. to 21 mm. by 15 mm. Probably a new species.

Locality—Found in No. IV of the Ft. Hunter section.

BATHYURUS (?) Billings

Bathyurus sp. ? Pl. 16 fig. 9

Glabella oblong, very convex; eyes midway between the front and back. Surface smooth. Size of glabella 12 mm. in length and 7 mm. in width. Several glabella were found, but none in a condition perfect enough to warrant a positive identification.

Locality.—No. IV 2, of the Ft. Hunter section.

Bathyurus ellipticus, n. s. Pl. 16, figs. 5, 6

Glabella very convex, elliptical, length slightly exceeding the width, destitute of lateral furrows. Neck furrow well defined. Margin of the glabella with a thick, narrow border which turns up in front, presenting a truncated appearance. In the imperfect specimens at hand a triangular portion of the fixed cheek curves down behind the eye.

Eyes situated midway between the front and back.

Surface covered with strong, numerous tubercles. Width of cephalon about 10 mm., length 7 mm.

This species differs from *B. conicus* Billings, in that the glabella is elliptical and in the turning up and seeming truncation of the anterior margin of the cephalon. A comparison of one of the type specimens of *Menocephalus globosus* Billings, kindly loaned by Prof. J. F. Whiteaves, showed a strong resemblance to our species. The cephalon of *M. globosus* is more globose, the tubercles are smaller and less numerous and the sutures extend directly back from the eyes to the posterior of the cephalon. In *B. ellipticus* the fixed cheeks extend in a narrow wedge to the side of the cephalon.

Locality.—Very rare in bed VI 2, near Ft. Hunter.

Brachiopoda

DALMANELLA Hall and Clark

Dalmanella (orthis) wemplei, n. s. Pl. 17 figs. 10, 11, 12, 13

Shell small, sub-circular, bi-convex; hinge line from four-fifths to equal the greatest width of the shell; cardinal angles slightly rounded. Pedicle valve convex, in some specimens somewhat carinate, beak projecting beyond the hinge line, brachial valve much less convex and with a distinct mesial depression along the middle of the valve. Surface marked by fine, radiating striæ of two kinds, the stronger alternating with from two to four smaller ones, which increase by bifurcation and implantation.

This species resembles *O. macleodi* Whitfield, but has not the same arrangement of the striæ.

Locality.—Found near Ft. Hunter, N. Y., in No. IV 2.

Dalmanella holiensis, n. s. Pl. 17, fig. 9

Shell sub-circular, hinge line less than the greatest width of the shell. Cardinal angles rounded. Ventral valve convex, with the greatest convexity near the beak. Beak extending somewhat beyond the hinge. Surface marked by strong, radiating striæ which bifurcate from two to three times near the front of the shell. Length and breadth 7 mm. This species differs from *D. wemplei* in having coarser and fewer striæ.

Locality.—No. IV 2 of the Ft. Hunter section.

SYNTROPHIA Hall and Clark

Syntrophia palmata, n. s. Pl. 17, figs. 14, 15, 16, 17

Shell of medium size, moderately convex, length to width as 9 to 11. Hinge straight, almost as long as the width of the shell. Ventral valve with a wide, poorly defined sinus which can not be distinguished near the beak.

Shell substance fibrous, which, in partially exfoliated specimens gives a concentric appearance as shown in fig. 14.

In exfoliated specimens peculiar radiating lines are shown which are probably impressions of the vascular sinuses. This is shown in figs. 15 and 17.

Size 11 mm. in width, 9 mm. in length.

This species bears a strong resemblance to *Triplesia* (*Syntrophia*) *lateralis* Whitfield.

Locality.—In Nos. II 5 and IV 1 of the Ft. Hunter section.

LINGULA Bruguiere

Lingula, *cf.* **L. iole** Billings

Pal. Fos., vol. 1, 1861–65, p. 215, fig. 199.

A small lingula of which both valves are retained was found. It is closely related to *L. iole* of Billings, but can not be included in that species with certainty.

Locality.—Found near Ft. Hunter.

Echinodermata

Crinoid Stem and Plates

Pl. 16, figs. 16, 17, 18

A number of excellently preserved plates probably of cystideans were found on weathered slabs of impure limestone. They were, however, not sufficient for specific or generic identification.

Locality.—Calciferous, near Ft. Hunter, N. Y.

Cephalopoda

CYRTOCERAS Goldf.

Cyrtoceras kirbyi (?) Whitfield Pl. 17, Figs. 3, 4

A. M. N. H. Bull., vol. 2, p. 57, Pl. 10

A specimen which has been doubtfully referred to this species is as follows: Shell almost straight (this may be due to pressure). Transverse section broadly oval, tube gradually enlarging. Septa strongly concave, almost angulate on the side, strongly arching on the back of the shell.

Air chambers numerous, having a depth of somewhat less than 1 mm. where the longer diameter is 12 mm. and the shorter 7 mm.

Locality.—No. VI 2 of the Ft. Hunter section.

Cyrtoceras sp. (?) Pl. 17, figs. 5, 6.

A small specimen 12 mm. long and 8 mm. in diameter with 5 septa to 3½ mm. can not be placed with any described species.

It may be a variety of *C. microscopicum* Dwight*, but is larger and has wider air chambers. *C. dictys* Billings†, is a larger shell, the septa in a shell twice as large as ours has air chambers of the same size.

Locality.—Found in bed V 2, near Ft. Hunter, N. Y.

ORTHOCERAS Breynius

Orthoceras primigenium Vanuxem

Pal. N. Y., vol. 1, 1847, p. 13, Pl. 3.
Am. M. N. H. Bull., vol. 2, p. 56, Pl. 10.

Hall's description is "elongated, terete, gradually tapering to an obtuse point; section circular; septa thin, deeply concave, closely approximated, being distant only 1-25 the diameter "

A few imperfect specimens were found in the Ft. Hunter section. No. II 3

Pelecypoda

RIBEIRIA Sharpe

The class relationship of this genus has been discussed both by Billings and Whitfield.

In the original description of the genus Sharpe (Geol. Jour., vol. 9, p. 157, Pl. 9, 1853) says- "This curious shell appears related to the family Calyptræidæ * * * It is equilateral, and both the transverse internal plate and muscular attachment are placed along the middle of the back of the shell; the external form may be described as a Calyptræa pressed together laterally till the sides nearly meet, leaving only a narrow opening for the foot of the animal."

Billings (Pal. .Fos. vol. 1, 1861–65, p. 339) states that "in general character his species agrees with the descriptions of Sharpe, but that the internal cast does not exhibit the muscular impression."

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*Am. Jour. Science, 3rd series, vol. 27, p. 256, fig. 11.
†Pal. Fos., vol. 1, p. 192, fig. 176.

His argument for Pelecypod relationship is based on the presence of a small aperture of semi-circular shape "just beneath the umbo and in front of it which appears to be the entrance to a tubular passage running backwards over the transverse plate into the general cavity of the body." This cavity he supposed "served the function of a byssal orifice and that these species were anchored by a byssus passing through the beak." He placed his species in the genus *Ribeiria* provisionally and proposed the name *Ribeirina* if further examination showed a separation necessary.

After a full discussion of the genus, Whitfield (A. M. N. H., vol. 1, p. 343, 1881–86) says: "I think there can be no question about their relationship to the Ceratiocaridæ (or Phyllocaridæ, if we adopt Prof. Packard's new name)."

In Eastman's translation of Zittel's Text Book of Paleontology, 1899, is this statement: "There is no satisfactory evidence of their Crustacean nature."

Our species belongs to that division of the genus to which *R. califer* Bill., *R. longiuscula* Bill. and *R. compressa* Whit. are referred. Without going into a further discussion of the relationships, it should be said, however, that there is so much doubt as to the correctness of the identification with Sharpe's genus that we refer our species to it with a great deal of doubt.

Ribeiria (?) nuculitiformis, n. s., Pl. 16, figs. 10, 11, 12, 13, 14

Shell small, resembling, in general appearance, a nuculite. Compressed laterally; about one-half as high as long. Dorsal margin concave, sides convex. In the casts of the shell the anterior is rounded, with a deep notch just below the beak. Notch about one-quarter as long as the shell, extending obliquely toward the middle of the ventral side. The shell is not bilaterally symmetrical. From Pl. 16, fig. 12, it will be seen that there is a sinus and fold on the right side and a corresponding fold and sinus on the left.

Surface smooth as far as known.

This species resembles *R. calcifer* Bill., but differs in the presence of the fold near the dorsum and in the depth of the notch.

Size varies from 1½ mm. wide by 3 mm. long to 6 by 12 mm.

An extremely abundant fossil in bed VI 3 and occasionally found in V 2 of the Ft. Hunter section.

R. nuculitiformis var. **equilatera** (?) Pl. 16, fig. 15

Shell as above, but without the fold. The dorsum is straighter than in *R. nuculitiformis*.

Rare in the Calciferous at Ft. Hunter, N. Y.

Cœlenterata

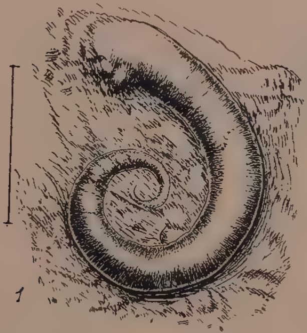
Monticulipora (?) sp.

A specimen resembling the branching forms of *M. lycoperdon* Say was found in the Ft. Hunter section. The specimen is a cast of the interior, the original material having been dissolved away. Until more and better material is found it will not be possible to make a definite determination.

Explanation of Plates

EXPLANATION OF PLATE 15

Fig.		Page.
1.	*Ecculiomphalus multiseptarius*, n. s. View of the upper side	11, **123**
2.	Natural section showing partitions.	
3, 4.	Two views of young (?) forms.	
5.	*Ophileta discus*, n. s. Lateral view	12, **124**
6.	Upper view.	
7.	*Raphistoma obtusa*, n. s. View of under side	13, **125**
8.	View of upper side.	
9.	Lateral view.	
10.	*Straparollus parva*, n. s. Side view	15, **127**
11.	View of upper side.	
12.	*Pleurotomaria floridensis*, n. s. Side view	13, **125**
13.	*Murchisonia mohawkensis*, n. s. Side view	14, **126**
14.	*Holopea turgida* Hall. Side view	13, **125**
15, 16, 17, 18.	*Bellerophon calcifer*, n. s. Lateral and upper views, showing variations in this species	14, **126**
19, 20, 21.	*Bellerophon subovatus*, n. s. Dorsal, lateral, and ventral views	15, **127**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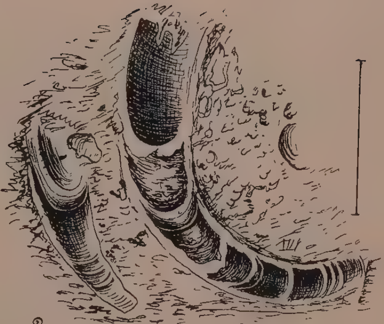
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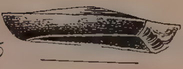
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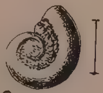
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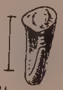
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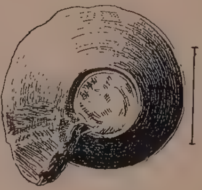
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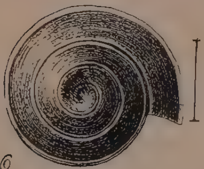
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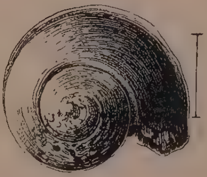
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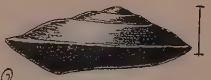
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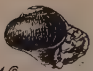
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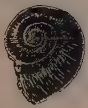
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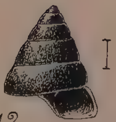
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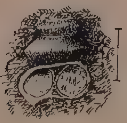
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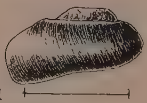
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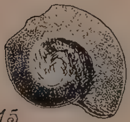
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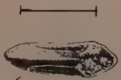
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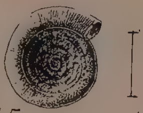
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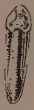
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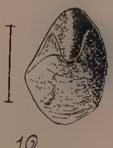
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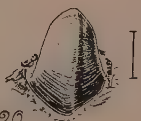
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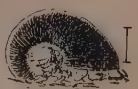
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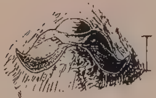
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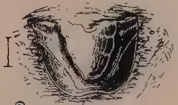
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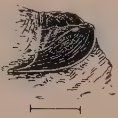
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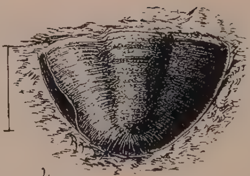
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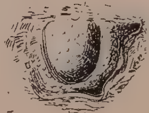
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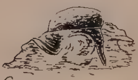
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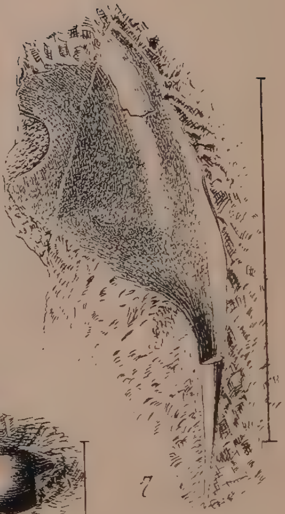
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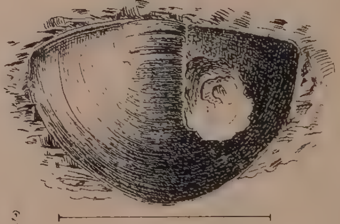
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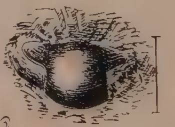
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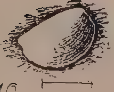
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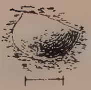
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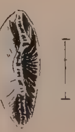
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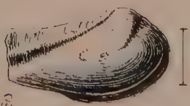
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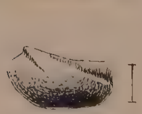
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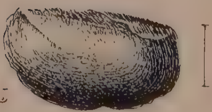
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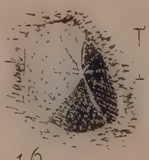
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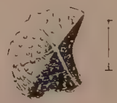
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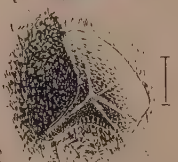
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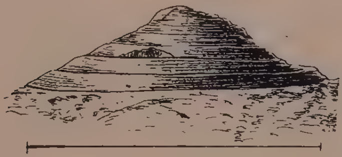
EXPLANATION OF PLATE 16

Fig.		Page.
1, 3.	*Harrisia parabola*, n. s. Frontal and lateral view of the cephalon of the same specimen	15, **127**
2.	Dorsal view of another specimen.	
5, 6.	*Bathyurus ellipticus*, n. s. Dorsal and lateral views of the same specimen..........	17, **129**
9.	*Bathyurus?* Dorsal view of the glabella........	17, **129**
4.	*Asaphus convexus* (?) n. s. Dorsal view of a well-preserved pygidium........................	16, **128**
7.	*Asaphus canalis* (?). Ventral view of a free cheek..	16, **128**
8.	Dorsal view of a pygidium of another individual.	
10, 11.	*Ribeiria* (?) *nuculitiformis*, n. s. Lateral views of the shell..................................	21, **133**
12.	Posterior view of a cast.	
13, 14.	Lateral views of casts.	
15.	*Ribeiria nuculitiformis* var. *equilatera* (?). Lateral view..	21, **134**
16, 17, 18.	Crinoid plates. Showing the surface markings of the plates.	19, **131**

EXPLANATION OF PLATE 17

		Page.
Fig. 1, 2.	*Pleurotomaria hunterensis*, n. s. Side and upper views of a very large specimen..	12, **124**
3, 4.	*Cyrtoceras kirbyi* (?) Whitfield. Ventral and lateral views of the same specimen	19, **131**
5, 6.	*Cyrtoceras*, sp. Ventral and lateral views of the same specimen....	19, **131**
7, 8.	Upper and lower views of the most abundant forms of *P. hunterensis*.	
9.	*Dalmanella holiensis*, n. s. View of pedicle valve....	18, **130**
10, 12.	*Dalmanella wemplei*, n. s. Views of pedicle valve of different specimens....	17, **129**
11, 13.	Views of brachial valve of different specimens.	
16.	*Syntrophia palmata*, n. s. Exterior of pedicle valve....	18, **130**
14.	Valve showing a partially exfoliated surface.	
15, 17.	Valves showing the vascular markings.	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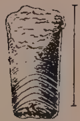
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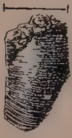
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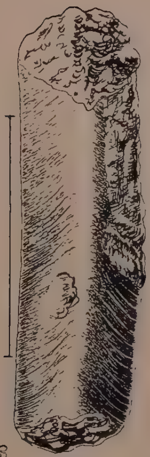
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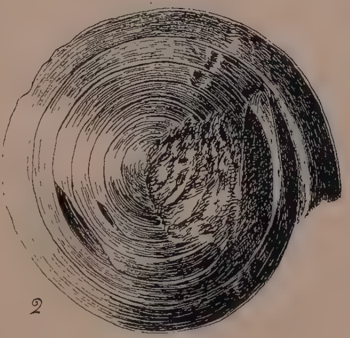
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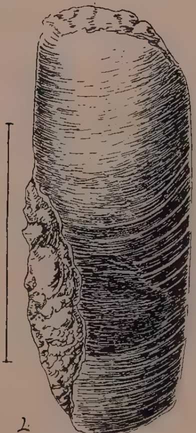
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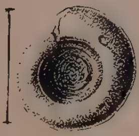
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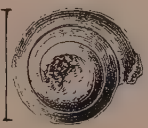
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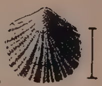
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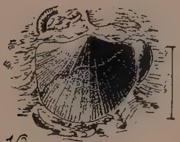
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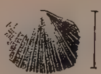
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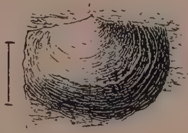
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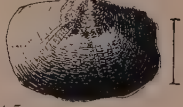
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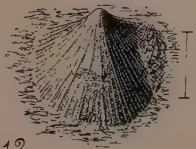
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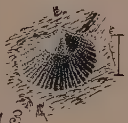
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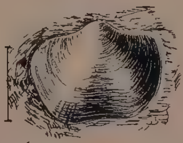
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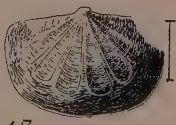
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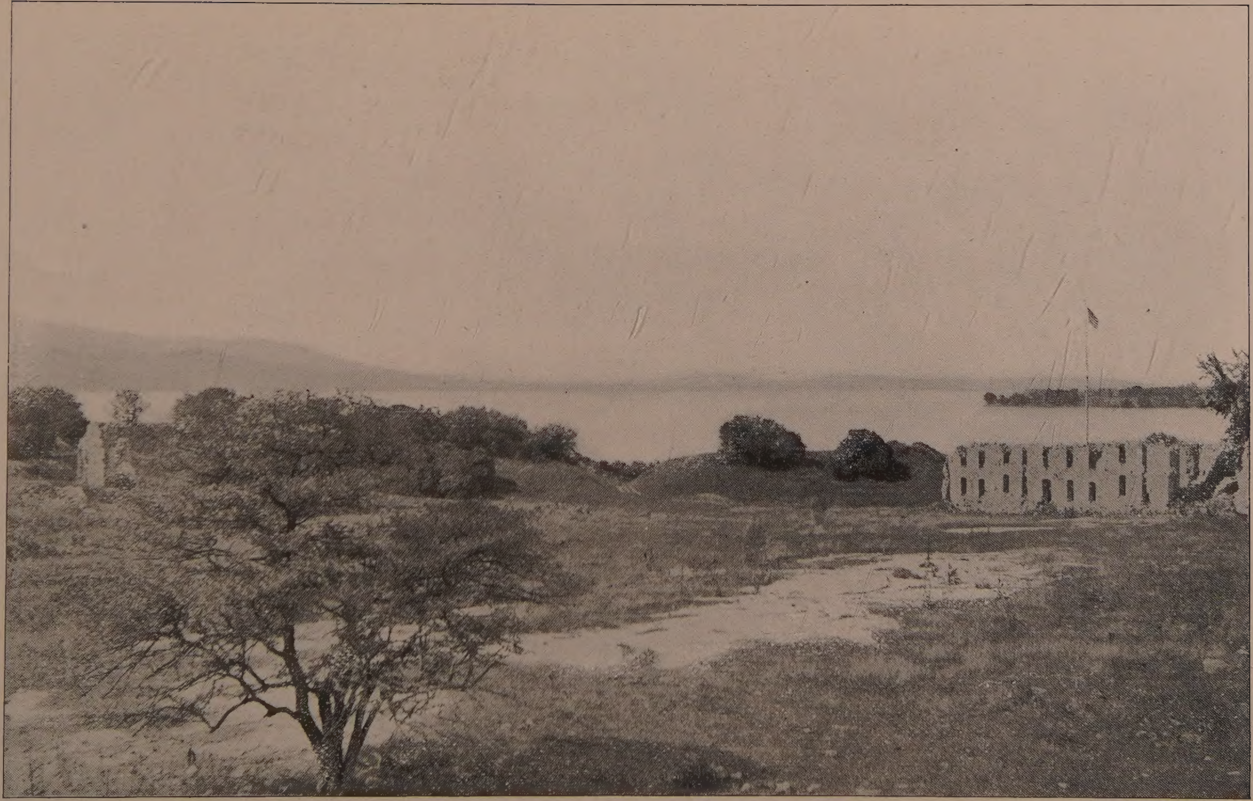
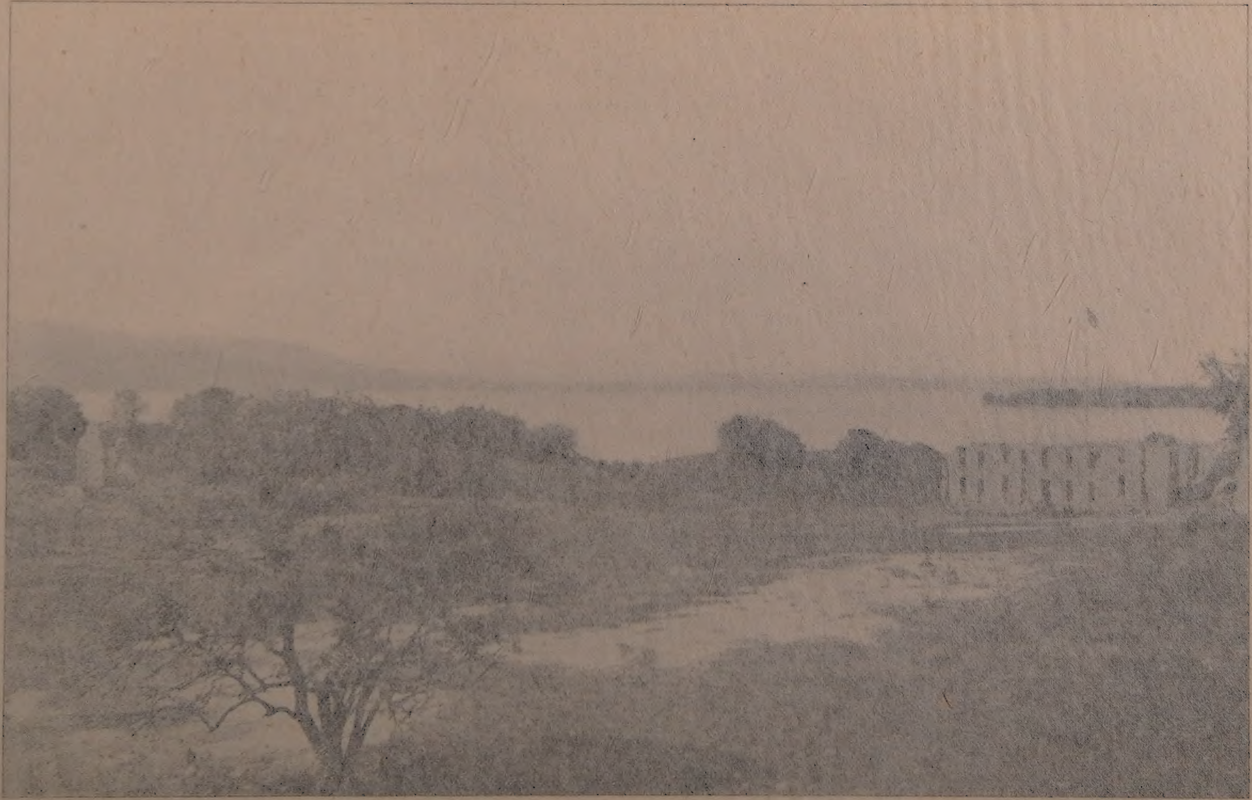


Top of the Chazy Limestone, Ruins at Crown Point, N. Y.



Top of the Chazy Limestone, Ruins at Crown Point, N. Y.